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EXPERIMENT: No. 1 Ternary Mixture-II Date / /
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- Type :- solid - solid - solid mixture

- Solubility Tests:

Tests	Observation	Inference
Take small amount of mixture + water shake & allow to stand	Solid does not dissolve	Water insoluble solid is present

Conclusion: All the compounds in the mixture are Water insoluble solid

- Determination of chemical Type:-
(Those Water insoluble solid compound)

Tests	Observation	Inference
i) About 0.01 g of mix + 1-2 cm ³ sat. NaOH & shake till effervescence stops. Filter	i) strong effervescence before filtration with conc HCl → a solid reappears	carboxylic acid is present.
ii) Residue from test (i) washed to remove acid. Remaining residue + 2 cm ³ of 10% NaOH. shake & filter.	Acidifying filtrate with 1:1 HCl & cooling → a solid reappears	phenolic compound is present
iii) Residue from test (ii) washed with NaOH to remove phenol. Residue + 2 cm ³ 1:1 HCl shaken & filter	Filtrate cooled in ice + 20% NaOH & cool in ice bath → No solid reappears	Base compound is absent

iv	Residue washed 2-3 times with HCl to remove base Remaining residue is insoluble in all above specified reagents	-	Neutral compound is present.
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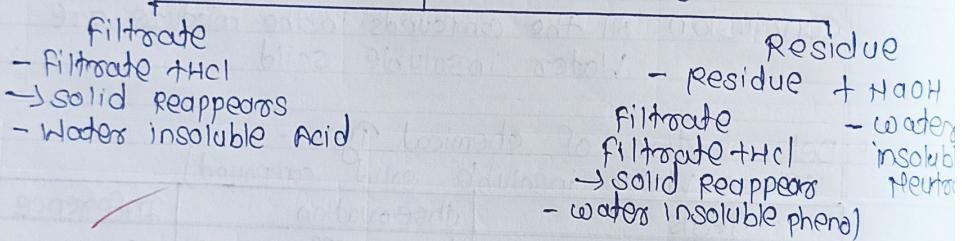
Conclusion :- chemical type of given mixture is

- i) Water insoluble acid solid.
- ii) Water insoluble phenol solid
- iii) Water insoluble neutral solid.

- o Separation of solid - solid - solid mixture :-

A - separation method :-

Mixture + Saturated NaHCO_3



- B. Yield of the separating compound :-

- i) Weight of water insoluble Acid = 0.9 g
- ii) Weight of water insoluble phenol = 0.7 g
- iii) Weight of water insoluble Neutral = 0.9 g

- o Identification of organic compound :-
(Water insoluble Acid)

Tests	Observations	Inferences
Nature	Solid	Carbohydrates, acid, etc. may be present
Colour	White	Carbohydrates, Acid amides, etc. may be present.

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odours	pungent & irritating	Acetic acid, benzoid Acid etc. may be present.
ignition test:- Heat compound on an oxidised copper foil	sooty flame is observed	Aromatic compound or aliphatic comp contain more than four carbon atom
test for unsaturation: KMnO₄ test :-		unsaturated or easily oxidisable
Add few drops of dilute KMnO ₄ to small amount of compound & shake	Decolorisation	compound may be present.
<ul style="list-style-type: none"> • Detection of elements (N, S & Halogens):- <p>preparation of Lassaigne's filtrate (sodium fusion extract):-</p> <ol style="list-style-type: none"> Heat a small amount of sodium metal piece in dry fusion tube till it melts. Add small amount of dry substance of molten sodium After initial reaction has subsided, Heat the fusion tube further to red heat & then drop it in 5 cm³ of distilled water taken in porcelain dish covering it immediately with an asbestos sheet. carry out two more fusion in the similar way & concentrate the contents of the dish to half its volume. cool & filter, Test the filtrate for litmus action At this stage, it should be basic. test the filtrate for the detection of elements. 		
Teacher's Sign:		
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Tests	Observation	Inference
0.5 cm ³ Alkade + freshly prepared sat FeSO_4 boil mol & add excess of H_2O_2 is observed do it.	No green coloured	Nitrogen is absent.
0.5 cm ³ Alkade + 2-3 drop of 5% sodium nitroprusside solution	No violet colour is observed	Sulphur is absent.
0.5 cm ³ Alkade + NaHNO_3 + AgNO_3 solution	precipitation is not obtained	Halogen is absent.

Conclusion :- The given compound contain C, H, O elements.

- Determination of the functional group of compound :-

Group I :- compounds containing C, H, O elements :-

Tests	Observation	Inferences
Test for carboxylic Acid Groups:- i) Compound + sat NaHCO_3	Soluble with brisk effervescence	Carboxylic acid - COOH present.
ii) Compound + $\text{H}_2\text{O} \rightarrow$ few drop of neutral FeCl_3 solution.	Buff colour	Benzene acid is present.

Conclusion :- The given compound contain $\text{Ar}-\text{COOH}$ functional group.

- Physical constant :-

Melting point	Name and structure of the compound
121 °C	Benzene acid 

- Identification of organic compound :-
(Water insoluble phenol)

- Preliminary test :-

Test	Observation	Inference
Nature	Solid	carbohydrocarbons, phenol acids etc. may be present
Colour	Buff	Amino, phenols, Naphthols amines etc may be present
Odour	Carbolic	phenols & naphthols may be present
Ignition Test:- Heat compound on on oxidised copper foil.	sooty flame is observed	Aromatic or aliphatic compound containing more than 4 carbon atoms.
Test for unsaturation KMnO ₄ Test:- Add few drops of KMnO ₄ to small amount of compound & shake.	Decolourisation	Unsaturated or easily oxidisable compound may be present.

- Detection of elements (N, S & Halogens) :-

Preparation of Lassaigne filtrate (sodium fusion extract)

- Heat a small piece of sodium metal in dry fusion tube
- Add small amount of dry substance to molten sodium
- After that heat the tube to red heat & then drop in distilled water taken in porcelain dish covering it immediately with asbestos sheet.

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iv) carry out two more fusion in similar way & concentrate the content of dish to half in volume.

v) cool & filter. Test the filtrate for litmus action, it should be basic.

vi) Test the filtrate for the detection of elements.

Tests	Observation	Influence
0.5 cm ³ filtrate + freshly prepared sat. FeSO_4 sol & cool & add excess of dil. H_2SO_4	No blue colour is observed.	Nitrogen is absent.
0.5 cm ³ filtrate + drops of 5% sodium molybdate	No violet colour is observed	Sulphur is absent.
0.5 cm ³ filtrate + conc HNO_3 Add AgNO_3 sol	precipitate is not obtained	Halogen is absent.

Conclusion:- The given compound contain $\text{C}, \text{H}, \text{O}, \text{N}$ elements.

- Determination of the functional group of compound :-

Group I : compounds containing $\text{C}, \text{H}, \text{O}, \text{N}$ elements :-

Tests	Observation	Inference
Test for phenolic group		
i) compound + NaOH solution	Easily soluble	phenolic - OH present.
ii) compound + H_2O_2 + drops of alcoholic FeCl_3 solution	Buff precipitate	phenolic - OH present

Conclusion:- The given compound contain phenol group.

- Physical constant:-

Melting point	Name & structure of compound
123°C	β -naphthol

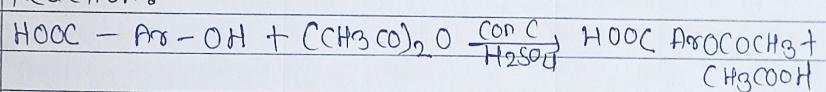
Derivative of Water Insoluble Acid :-
(Acetyl derivative of hydroxy Acid) :-

• Procedure :

- i) Take 1 g of compound in dry test tube.
- ii) Add 2 cm³ of acetic anhydride & 1 drop of conc H₂SO₄ do it.
- iii) Heat to boiling, cool & pour the content into 10 cm³ of cold water in a dish.
- iv) If solid does not separate out, Heat for a min more cool and shake well.
- v) Filters the solid product, wash with water.
- vi) Dry & determine the melting point.

•

• Reaction :



• Physical constant :

The melting point of acetyl derivative of hydroxy acid is 123°C

• Purification of compound :

i) Purified compound : Water insoluble neutral

ii) Method of purification : Recrystallization

iii) Yield of purified product g - 0.7 g

iv) Melting point of product: 80°C

• Results :

• Identified compound :

Compound Identification	elements detected	functional group	physical constant	Name & Structure of compound	Derivative prop with melting Point.
Water	Carbon C, Hydrogen H, Oxygen (O)	As - COOH	Melting Point = 121°C	Benzoic Acid COOH	Acetyl derivative of Hydroxy acid Melting point = 123°C
Water Insoluble Acid					

• Identified compound :-

Compound Identification	Elements detected	functional group	physical constant	Name & Structure of compound
Water	carbon C,	phenol	Melting	β -naphthol
Insoluble	Hydrogen H,		Point =	
phenol	Oxygen (O)		123°C	

• purified compound :-

Purified compound	yield of compound	physical constant
Water insoluble Neutral	0.7 g	Melting point = 80°C

~~choice~~

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Ternary mixture-II

Type : Solid-Solid-Solid mixture

Solubility Test :

Tests	Observation	Inference
i) Take small amount of mixture + waters shake & allow to stand dissolve	Solid does not dissolve	Waters insoluble Solid may be present.
ii) Aqueous layers form above test, heat in porcelain dish till waters gets evaporate	Solid reappears	Waters insoluble Solid is present

Conclusion :- In the given mixtures, there is one waters soluble solid & two waters insoluble solid.

For waters soluble solid,

Molish Test :

Aqueous layers form Ring is formed
above test + α -naphthol
in ethanol + 6 drop of
conc. H_2SO_4

Carbohydrates
is present

Determination of chemical type :

(One waters soluble solid + 2 waters insoluble solid)

Test	Observation	Inference
For waters soluble solid : 0.01 g mix + H_2O shake & filters		
ii) Filtrate + sat $NaHCO_3$	No effervescence (carboxylic acid absent)	Teacher's Sign:

Swastik

i) Filtrate + aq. FeCl ₃ soln	No violet colour	Phenol absent
ii) Filtrate + red litmus	No change	Base absent
iii) None of above test is positive	-	Neutral compound is present
For water-soluble solid		
i) mixture + sat. NaHCO ₃ Shake till effervescence Conc. HCl \rightarrow a solid does not disappear	on acidifying with conc. HCl \rightarrow a solid disappears	Carboxylic acid absent
ii) Residue from above test washed 2-3 times with NaHCO ₃ . Residue + 10% NaOH. Shake & filter	on acidifying with HCl & cooling \rightarrow solid disappears	phenolic compound is present
iii) Residue from above test washed with NaOH to remove phenol. Residue + 10% NaOH. Shake well & filter	Filtrate cooled in the ice + 20% NaOH drop by drop till alkaline \rightarrow solid disappears	Basic compound is present

Conclusion : Chemical type of given mixture is

- water-soluble Neutral solid
- water-insoluble phenol Solid
- water-insoluble Base Solid

Separation of solid-solid mixture :

A. Separation method of :

miniture + diethyl ether

Filtrate

Residue

- Evaporate the filtrate
- \rightarrow Solid disappears
- water-soluble neutral
- Filtrate
- Residue
- water-insoluble
- water-base
- Phenol

vi) Add small amount of dry substance to molten sodium
 vii) Heat fusion tube till it turns red hot & then drop in
 distilled water taken in porcelain dish to half covering
 in immediately with an asbestos sheet.
 viii) Concentrate the content to half its volume.
 ix) Cool & filter. Test the filtrate for litmus action. It should
 be basic.

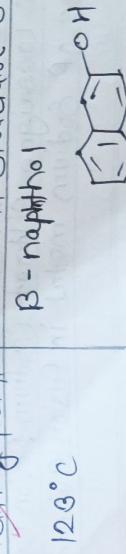
vii) Use the filtrate for further tests :

Tests	Observations	Inferences
0.5 cm ³ Filtrate + Sat FeSO ₄ , boil, cool & add. excess of dil. H ₂ SO ₄	No blue Colour	Nitrogen absent
0.5 cm ³ Filtrate + 5% of sodium nitroprusside solution	No violet Colour	Sulphur absent
0.5 cm ³ Filtrate + conc HNO ₃ . Add AgNO ₃	No precipitate	Halogen absent

Conclusion : The given compound contain C, H, [O] elements.
 Determination of functional Group of compounds:
 • Group I : compound containing C, H, [O] elements.

Tests	Observations	Inferences
Test for phenolic Groups: i) Compound + NaOH	Easily Soluble	phenolic - OH present
ii) Compound + H ₂ O + drop of alcoholic FeCl ₃	Buff precipitate	phenolic - OH present

Conclusion : The given compound contain phenolic group
 physical constant
 melting point Name and structure of the compound



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Identification of Organic Compound : II			
(Water Insoluble Base)			
Tests Observations Inferences			
Nature	Solid	carbohydrides, phenols, acids, amines, etc. may be present.	
Colours	yellow	Nitro Compounds, di ketones, etc.	
Odours	fishy	Amines, aniline, etc.	
Ignition Test :	Sooty flame	Aromatic or aliphatic compound containing more than four carbon	
Heat compound on oxidised Copper foil			
Test for unsaturation Knoevenagel Test :		Unsaturated or easily oxidisable compound may be present.	
Add drops of dil. KMnO ₄			
to small amount of Compound & Shake			
Detection of Elements (N, S and halogen)			
Preparation of Lassaigne filtrate (Sodium fusion Extract):			
Heat small piece of Sodium metal in dry fusion tube till it melts.			
ii) Add small amount of dry substance to molten Sodium.			
iii) After initial reaction, heat it to red hot & droop in distilled coolers taken in porcelain dish covering immediately with asbestos sheet.			
iv) Cool out & add more & concentrate the content of the dish to half its volume.			
			Teacher's Sign: _____

→ cool & filter. Rest filtrate is it is basic.
vii) use filtrate for following reactions.

Tests	Observations	Inferences
0.5 cm ³ filtrate + few ml FeSO_4 , boil cool & add excess of dil. H_2SO_4	Green colour	Nitrogen present
0.5 cm ³ filtrate + 5% Sodium nitroprusside solution	No violet colour Sulphur absent	
0.5 cm ³ filtrate + conc. HNO_3 + AgNO_3 solution	No precipitate	Halogen absent

Determination: The given compound contain C, H, O & N elements.

• Determination of functional Group of compound in Group II: Compounds containing C, H, O & N elements.

Tests	Observations	Inference
Test for Amines Dissolve compound in dil. HCl , cool in ice + cold NaNO_2 soln.	A clear solution which when added to soln of β -naphthol in NaOH give orange red dye	Aromatic primary amino ($\text{C}_6\text{H}_5\text{NH}_2$) group present.

Conclusion: The given compound contain aromatic primary amino group.

• Physical constant:

Melting point	Name & Structure of the compound
114°C	m-nitro aniline $\text{NH}_2\text{C}_6\text{H}_4\text{NO}_2$

- Derivative of water insoluble phenol :-
- (Benzoyl derivative of phenol) :-
- Procedure :-
 - Dissolve 0.5 cm³ of compound in 10 cm³ of 10% NaOH in a 100 cm³ conical flask.
 - Add 1 cm³ of benzoyl chloride to it & cork flask.
 - Shake flask vigorously till the smell of benzoyl chloride disappears completely.
 - Filter the solid under suction & wash it first with dil. HCl & then with coolers.
 - Recrystallise the product from alcohol. Dry & determine the melting point.
- Reaction :-
$$\text{C}_6\text{H}_5\text{OH} + \text{C}_6\text{H}_5\text{COCl} \rightarrow \text{C}_6\text{H}_5\text{O}-\text{C}(=\text{O})-\text{C}_6\text{H}_5 + \text{HCl}$$

- Physical constant :-
The melting point of benzoyl derivative of phenol is 107°C.
- Purification of compound :-
 - Purified compound : water soluble Neutral
 - Method of purification : Recrystallization
 - Weight of purified product : 0.8 g

iv) melting point of product : 140°C

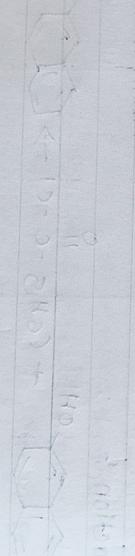
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1000 students return to university

• Canada to introduce 100000

• increase in 2018 to 2.0 million

• 1000000 students in 2020



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• Results :-

• Identification Compound 'I'

Compound	Elements	functional group	Physical constant	Name of compound	Derivative formed with
Identification Detested		Group	constant structure	meting point	
water	Carbon C, phenolic	meting point	β -naphthol	β -naphthol	Benzyl derivative
Insoluble	Hydrogen H, (-OH)	point	phenol	phenol	meting point
phenol	Oxygen (O) group	$\approx 108^\circ\text{C}$		$\approx 107^\circ\text{C}$	meting point

• Identification Compound 'II'

Compound	Elements	functional group	Physical constant	Name of compound	Derivative formed with
Identification Detested		Group	constant	of compound	
water	Carbon C, Aromatic	melting point	m -nitroaniline		
Insoluble	Hydrogen H, primary	point	NH_2		
Base	Oxygen (O) amino	114°C		112°C	
	Nitrogen N (-NH ₂)				
	Group				

• purified compound

Purified compound	Yield of compound	Physical constant
greater Soluble	0.8 g	melting point = 146°C

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Type : Solid - liquid mixture

Solubility test :-

Tests	Observations	Inferences
i) mixture + H ₂ O Shake well & allow to stand	a) solid does not dissolve b) No layers formed water miscible solid present.	water insoluble solid present.
ii) Aqueous layers form above test. Is heated till the liquid separate	Solid not reappears water insoluble solid present.	water miscible liquid

Conclusion : The compounds in the mixture are an aqueous insoluble solid, water insoluble solid & water miscible liquid

Determination of chemical type :
 (water insoluble solid + water insoluble solid + water miscible liquid)

Tests	Observation	Inferences
for water insoluble solid		
i) 0.01 g of mix + sat NaHCO ₃ . Shake till the effervescence stops	Acidifying with HCl → solid reappears filters.	Carboxylic acid is present
ii) Residue from above test washed 2-3 time with NaHCO ₃ . No remove		

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acid residue + 10 ml NaOH	Shake filters	
ii) Residue washed 2-3 times with aq. HCl to remove base. Residue is insoluble in all above reagents		Neutral compound is present
iii) Residue from above test washed 2-3 times with NaOH to remove phenol. Residue + 1 ml HCl + 2 filters	No solid disappears	base absent
i) water miscible liquid	water + phenol + base	carboxylic acid
ii) HCl + aq. FeCl ₃ + NaHCO ₃	No effervescence	phenol absent
iii) HCl + red litmus paper	No violet colour	phenol absent
iv) None of the above tests is positive	Paper not turn blue	base absent

Conclusion : Chemical type of given mixture is

- i) water insoluble Acid
- ii) water insoluble. Neutral
- iii) water miscible. Liquid

separation of solid - liquid mixture :
A. Separation method :

Distillation

In Distillation flask - insoluble solid + NaHCO₃ - Insoluble solid + NaHCO₃

Filtration

- Filtrate + conc. HCl - water disappears
- water insoluble acid

Residue - acid solution

- water soluble base
- neutral

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Q. Yield of the separating compound :

- Weight of water insoluble Acid = 0.9 g
- Weight of water Insoluble Neutral = 0.7 g
- Weight of water miscible liquid = 2.5 ml

Identification of organic compound : I
(water Insoluble Neutral)

• Preliminary test :

tests	observation	Inferences
Nature	Solid	Carbohydrides, acid amines, etc. may be present.
Colour	white	Carbohydrides, ammadic, amides, aromatic hydrocarbons etc.
Odour	Foul	Aromatic hydrocarbons, esters etc.

Dignition Test :

Heat the compound on oxidised copper foil.

Test for unsaturation

Knoy test :

Add. dil. Knoy to small amount of compound. Ground & shake

Decolourisation unsaturated or easily oxidisable compound may be present.

• Detection of Elements (N, S & Halogen) :

- Preparation of Lassaigne Fusion (Sodium fusion extract) :
- Heat small piece of sodium metal in dry fusion tube

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- i) add small amount of compound to the molten solution.
- ii) After initial reaction, heat the fusion tube to red heat & H₂ drop in distilled water taken in porcelain dish covering it immediately with asbestos sheet.
- iii) carry two more fusion & concentrate the content to half the volume.
- iv) cool & filter. Test filtrate the litmus action. It should be 6
- v) Test the filtrate for following reactions.

Tests	Observation	Inferences
0.5 cm ³ filtrate + freshly fesoxy, boil, cool & add excess of dil. H ₂ SO ₄	No green colour	Nitrogen absent
0.5 cm ³ filtrate + S.Y. Sodium nitroprusside	No violet colour	Barphur absent
0.5 cm ³ filtrate + conc. HNO ₃ add AgNO ₃	No precipitate	Halogen absent

Conclusion: The given compound contain $C_2H_5[O_2]$ elements.

Final round group of members of the commission

Group I: Compounds containing $C(H, CO)$ elements:

Test	Foot	Foot Contact	Observations	Differences
1	Heel	Heel	Heel contact	Heel contact

Test for Hydrocarbon	Iodine Test :	Dissolve 2-3 drops of 0.02 g compound in benzene + 2 cm ³ dil. I_2 in benzene. Shake.	Solutions remain violet in colour.
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~~Conclusion :- The given compound contain hydrocarbon functional group.~~

physical constant
melting point Name & structure of the compound
(water miscible Neutral)

70°C

Diphenyl



Identification of organic compound : II

(water miscible Neutral)

Preliminary Tests :

Tests	Observation	Inferences
Nature	liquid	carbohydrates absent alcohol, ketones, etc. may be present.
Colour	white	ketones, alcohols, esters, lactoses, etc.
Odour	pungent	Alcohols, etc. Aromatic or aliphatic
Ignition Test :	sooty flame	Compound containing more than four carbon oxidised copper foil
Heat compound on oxidised copper foil		

Test for unsaturation

KmnO₄ Test :

Add dil. KMnO₄ to no decolorisation Saturated Compound
small amount of
Compound & shake

- Detection of Elements (N, S & halogen) :
- Preparation of Lassaigne filtrate (Sodium fusion extract)
- Heat small amount of Sodium in dry fusion tube till it melts.

i) Add the compound to it (if liquid, 2-3 drops).

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- iii) After the initial reaction, heat the fusion tube to red heat and drop it in distilled water taken in porcelain dish and cover immediately with asbestos sheet.
- iv) Cool the tube, pour fusion & concentrate the content of dish to half its volume.
- v) cool & filter, test the filtrate for litmus action. It must be basic.

vi) Use filtrate for further test:

Tests	Observation	Inference
0.5 cm ³ filtrate + Fresh Sat. FeSO ₄ , boil, cool & excess of dil. H ₂ SO ₄	No green colour	Nitrogen absent
0.5 cm ³ filtrate + 5% of Sodium nitroprusside	No violet colour	Sulphur absent
0.5 cm ³ filtrate + conc. HNO ₃ Add AgNO ₃	No precipitate	Halogen absent

Conclusion: The given compound contain C, H, [O] elements

Determination of functional group of compounds:

Group I: Compounds containing C, H, [O] elements:

Tests	Observation	Inferences
Test for alcohols: Compound (if liquid) in dry test tube + sodium metal	Effervescence due to formation of H ₂ gas.	Alcoholic -OH group present.
		1.5. Handwritten notes: 1. Alcohols 2. Ester 3. Phenol

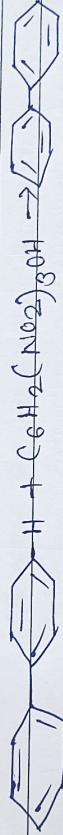
Conclusion: The given compound contain Alcohol functional group.

Physical constant:

Melting point	Name & structure of the compound
678°C	Ethyl alcohol $\text{CH}_3 - \text{CH}_2 - \text{OH}$

Derivative of water insoluble Neutral :
(Picrate derivative of Hydrocarbon):

- Procedure :
- i) Dissolve 0.5 g of compound in 1 cm³ of benzene in dry test tube & add 1 cm³ of saturated solution of picric acid in benzene
- ii) Shake and warm the mixture of necessary on hot water bath. Cool it to room temp.
- iii) The product separates out. Filter it & wash it with few drops of benzene
- iv) Dry by passing filter paper & determine the melting point.
- Reaction :



- Physical constant
The melting point of picrate derivative of hydrocarbon is 220 °C.
- Purification of compound :

- i) Purified compound : water insoluble Acid
- ii) Method of purification : Recrystallization
- iii) Solvent used for purification : water
- iv) Yield of purified product : 0.8 g

✓ melting point of purified product : 121°C

Results :-

• Identified Compound : I

Compound	Elements functional group	Physical name & Derivatives
Identified	Detected	constant structure retention with of compound melting point
water	Carbon c. Hydrogen	methine
Insoluble	Hydrogen H	o-phenyl picrate derivative
Neutral	Oxygen (O)	$\text{C}_6\text{H}_4\text{CO}_2\text{H}$ carbon melting point = 226°C

Identified Compound : II

Compound	Elements	Functional group	Physical	Name of structure
Identified	Detected	Group	constant	of compound
water	carbon c.	alcoholic	melting	Ethyl alcohol
insoluble	Hydrogen H	(-OH)	point	$\text{C}_2\text{H}_5\text{OH}$
Liquid	Oxygen (O)	group	78°C	

Purified compound

Purified compound	Yield of product	Physical constant
solvents	Insoluble	Melting point
Acid	0.8 g	= 121°C

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Type :- Solid - Solid - Liquid mixture

Solubility Test :-

Tests	Observation	Inferences
i) mixture + H_2O shaken	a) solid does not dissolve & allow to stand	$water$ Insoluble solid present
	b) two layers are formed	$water$ Immiscible
ii) aqueous layers form	Liquid present	

above test is heated	Solid reappears	$water$ Soluble solid present
iii) all liquid evapors		

Conclusion : The compounds in the given mixture are
water Insoluble solid, water Soluble solid
& water Immiscible liquid.

Determination of chemical type :

(water Insoluble solid + water Soluble solid + water
Immiscible liquid)

Tests	Observations	Inferences
For water Insoluble solid		
i) 0.01 g of mixture + sat $NaHCO_3$. Shake well till before filtration	Bitterness	Carboxylic acid is present
effervescence stop	Acidifying filtrate	
With conc. H_2SO_4 .	With conc. H_2SO_4	Carboxylic acid is confirmed
Solid reappears		
For water Soluble solid		
0.01 g mixture + H_2O		

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Shake & Filter 1 Filter + Sat. NaHCO_3	Effervescence	water Soluble carboxylic acid is present
For water Immiscible liquid		
i) Liquid + Sat. NaHCO_3 shake, two layers formed	No effervescence No two layers	Carboxylic acid absent
ii) Liquid + dil. NaOH excess shake, two layers formed	Aqueous layers + 1:1 HCl still acidic \rightarrow no two layers	phenol is absent
iii) Liquid + 1:1 HCl , shake over, two layers formed	Aqueous layers + 20% NaOH \rightarrow no emulsion	Base is absent
iv) All the above tests are negative		The liquid is neutral compound

Conclusion: chemical type of given mixture is

- i) water Insoluble Acid
- ii) water Soluble Acid
- iii) water Immiscible Neutral

- Separation of solid - liquid mixture :-

卷之三

In separating funnel mixture + H_2O

→ China, Sichuan, 1928

NaHCO_3 - Aqueous Na_2CO_3 - Aqueous Na_2CO_3

ପାଇଁ ପାଇଁ

Solid reappears after water. Insoluble

Acid
Ammonium

B. Yield of the Separating Compound:

- i) weight of coothes insoluble. Acid = 0.7 g
- ii) weight of water insoluble Acid = 0.8 g
- iii) volume of water immiscible neutral = 3.5 ml

- Identification of organic compound : I
(coothes Insoluble Acid)

- Preliminary Test :

Tests	Observations	Inferences
Nature	Solid	Carbohydrates, acid, ketone, amide, etc. may be present
Colour	white	Carbohydrate acid, anilides, esters etc.
Odour	pungent & intoxicating	Acetic acid, acid halides, etc.
Ignition Test:	sooty Flame	Aromatic or aliphatic compound more than four carbon atoms
Heat compound on an oxidised (copper foil) test for unsaturation:		unsaturated or easily available
Kmno4 Test:	Decolourisation of KMnO4 to comp and shake	Decolourisation of KMnO4 to comp and shake
		may be present

- Determination of Elements (N, S & Halogens):
- Preparation of Lassaigne filtrate (sodium fusion extract)
- i) Heat small piece of sodium metal in dry fusion tube till it melts.
- ii) Add small amount of compound to it.
- iii) After that, heat the tube till it red heat and then put it

in distilled water. Take in porcelain dish and cover immediately with asbestos sheet.

- iv) Evaporate out two more & concentrate the contents to half of its volume.
- v) cool & filter. Test for litmus action. It should be basic.
- vi) use the filtrate for the following reactions.

Tests	Observations	Inferences
0.5 cm ³ filtrate + fresh saturated FeSO_4 , boil, cool & excess H_2SO_4	No green colour	Nitrogen absent
0.5 cm ³ filtrate + 5% Sodium nitroprusside	No violet colour	Sulphur absent
0.5 cm ³ filtrate + conc. HNO_3 + AgNO_3	No precipitate	Halogen absent

Conclusion: The compound contain $\text{C}, \text{H}, \text{[O]}$ elements

Determination of functional group of compound:

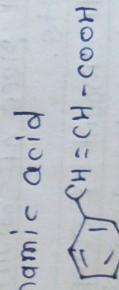
Group I: Compounds containing $\text{C}, \text{H}, \text{[O]}$ elements

Tests	Observations	Inferences
Test for carboxylic acid:		
i) compound + sat. NaHCO_3	soluble with brisk effervescence	Carboxylic acid -COOH present

Conclusion: The compound contain carboxylic acid functional group

- Physical constant:
- melting point
- name & structure of compound

133°C



- Identification of organic compound - II
(acids soluble in water)

Coagulation Test:

Tests	Observations	Inferences
Nature	Solid	Carbohydride, phenol, acids, dinitro, etc.
		may be present
Colours	white	Aromatic, acids, amide
Odours	pungent & irritating	Amides, ketones etc.
		Acetic acid, acetic anhydride, etc.
		Aromatic & aliphatic
Ignition test:	Heat compound on oxidised copper foil.	Compound containing more than 4 carbon.
Test for unsaturation	Sooty flame	
KmnO ₄ test:	Decolourisation	Unsaturated or easily oxidisable compound
Add. dil. KMnO ₄ to small amount of compound & shake		may be present

Detectors of Elements (N, S, Phlegm):

Preparation of Lassaigne filtrate (sodium fusion extract)

- i) Heat small piece of Sodium metal in dry fusion tube

iii) Heat the fusion tube to red heat & drop it in 5 cm^3 molten sodium. The sodium will melt the fusion tube & the molten sodium will cover the fusion tube.

distilled water in percentage by weight
with adhesions sheet.

iv) Carry out two more + concentrate the content of dish
to half in volume.

Teacher's Sign:

v) Cool & filter test the filtrate for litmus action. It should be basic
 vi) Use the filtrate for further reactions:

Tests	Observations	Inferences
0.5 cm ³ filtrate + fresh FeSO ₄ , boil, cool & add excess of dil. H ₂ SO ₄	No green colour	Nitrogen absent
0.5 cm ³ filtrate + 5% Sodium nitroprusside	No violet colour	Sulphur absent
0.5 cm ³ filtrate + conc HNO ₃ . Add AgNO ₃	No precipitate	Halogen absent

Conclusions :- The given compound contains C, H, [O] elements. Determination of functional group of compounds :-

Group I : Compounds containing C, H, [O] elements:

Tests	Observations	Inferences
Test for carboxylic acid	Not required	
i) Compound + NaHCO ₃	Soluble with brisk effervescence	Carboxylic acid -COOH present
ii) Compound + H ₂ O + few drop of Neutral FeCl ₃	Red Colour	Succinic acid

Conclusion :- The given compound contain carboxylic functional group HO-COOH

Physical Constant :-

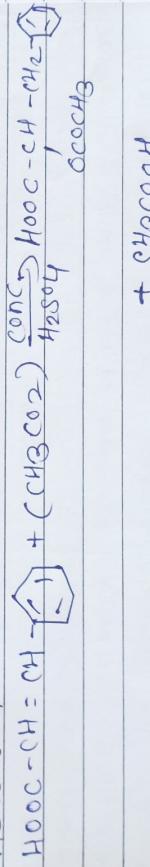
Melting point	Name & structure of compound
185°C	Succinic Acid CH_2-COOH CH_2-COOH

Derivative of carboxylic acid :-
(Acetyl derivative of hydroxy acid)

Procedure :-

- i) Take 1 g of compound in dry test tube
- ii) Add 2 cm³ of acetic anhydride + 1 dropup of conc. H₂SO₄
- iii) Heat to boiling, cool & pours the content into 10 cm³ of cold acetone in a dish.
- iv) If solid does not separate out, heat for 2 min cool & shake well
- v) Filters the solid product. wash with H₂O.
- vi) Dry & determine the melting point.

Reaction :-



Physical constant :-

The melting point of acetyl derivative of hydroxy acid is 170°C.

Purification of compound :-

i) purified compound : water immiscible Neutral

ii) method of purification :- distillation

iii) volume of purified product : 2.8 ml

iv) Boiling point of purified product : 202°C

Teacher's Sign:

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Results :

• Identified Compound : I

Compound	Elements	Functional Group	Physical state	Name of derivative	Derivative prepared
Identification	Detected				
Waters		Carbon c, carboxylic acid	melting point	Cinnamic acid	
Insoluble Acid	Hydrogen (c) oxygen (o)	-COOH	133°C		Boiling point = 170°C

• Identified Compound : II

Compound	Elements	Functional Group	Physical state	Name of structure	Derivative prepared
Identification	Detected	Group	constant	of compound	
Waters	Carbon c, Hydrogen (c) oxygen (o)	Carboxylic acid	melting point	Succinic acid	
Soluble Acid	-COOH	-COOH	185°C	$\text{CH}_2\text{-COOH}$	

• purified compound :

purified compound	State of product	Physical constant
Waters immiscible	2.8 ml	Boiling point
Neutral		= 202°C

Teacher's Sign

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Type: liquid - liquid - solid mixture

Solubility tests:

Tests	Observations	Inference
1) mixture + waters	a) two layers are formed	coacers immiscible
shake well & allow to stand	b) solid does not dissolve	liquid
	c) aqueous layers is coacers miscible	solid
	d) heat & evaporate	liquid

Conclusion: the mixture contain coacers immiscible liquid, waters miscible liquid & waters insoluble solid.

Determination of chemical type:

(coacers immiscible liquid + coacers miscible liquid + waters insoluble solid)

Tests	Observations	Inference
for coacers insoluble	Solid	0.01 g of mixture + 1-2 strong effervescent carbonic acid (1 cm ³ 5% NaHCO ₃) shake before titration is present ambo ill effervescence stops, acidity with conc. HCl \rightarrow solid disappears.
for coacers miscible	liquid	0.5 cm ³ liq. + 2 cm ³ H ₂ O

shake & take water reactant		
water extract + sat. NaHCO_3	No effervescence- absent	carboxylic acid absent
1% + aq. FeCl ₃ solution	No violet colour	phenol absent
1% + red litmus paper	paper not turn blue	base absent
None of above tests is positive		water miscible neutral is present
For another immiscible liquid		
liquid + sat NaHCO_3	NO effervescence absent	carboxylic acid absent
Two layers are formed		
liquid + dilute NaOH excess	Aq. layers + 1:1 HCl shakes. Two layers are formed	phenol absent
liquid + 1:1 HCl excess shake. Two layers formed	Aq. layers + 20% NaOH → no emulsion	base absent
all the above tests are negative		neutral compound is present
Conclusion :- chemical type of given mixture is		
i) water immiscible Neutral		
ii) water miscible Neutral		
iii) water insoluble Acid		
separation of liquid - liquid - solid mixture :-		
A. Separation method :-		
In Distillation flask	Distillation	
• water insoluble solid		
+ water immiscible liquid		
↓ Incorporating funnel		
+ sat. NaHCO_3		
organic layer	Aqueous layer	
water immiscible	• Aqueous layer	
Neutral	• Solid disappear	
	• water insoluble	

CO ₂ + OH ⁻	78°C
Name + (nature of compound)	Alcohol
Melting point	
Physical constant	group
Conclusion: The given compound is an alcohol	
Group I: Compounds containing C, H, O elements	
Determination of the functional group of compounds:	
Conclusion: The given compound contains C, H, O elements	
Test 1: Add Ba(OH) ₂	White precipitate + smell of H ₂ SO ₄
Test 2: Add AgNO ₃	White precipitate + smell of H ₂ SO ₄
Test 3: Add FeCl ₃	Green colour + smell of H ₂ SO ₄
Test 4: Add Na ₂ CO ₃	White precipitate + smell of H ₂ SO ₄
Test 5: Add KMnO ₄	Red colour + smell of H ₂ SO ₄

(i) ~~gas + the filtrate for following reactions:~~
basic.

(ii) CO₂ + Ba(OH)₂ solution reacts for litmus action. It should be dish to half of its volume.

(iii) Reactions of two more fusions + conclude the content of immediately with an aqueous shake.

5 cm³ distilled water taken in beaker & dilute

Teacher's Sign:		
dislodged wooden jacket in parcellin dish covering it		
heat the fusion tube to red heat & drop it in 5 cm ³	!!!	
Add small amount of Gypsum to molten sodium.	!!)	
fill it with	!!)	
heat small piece of sodium metal in dry fusion tube	!!)	
preparation of Lassaigne Frit (sodium fusion extract)		
decomposition of elements (N, S & hydrogen):		
shape		
amount of compound		
ability dissolvable		
ability to small		
decomposition		
add few drop of dil		
kmno ₄ test:		
test for unsaturation		
fill		
an oxidized copper		
heat the compound on Bunsen flame		
pyramidal as alpha-		
odors		
colours		
acetone, aldehydes etc		
ketones, esters,		
may be present		
ketones, alcohol, etc.		
carbohydrates, esters		
Nature	Liquid	
	obnoxious	
tests	inferences	
positive/negative test:		
(water immiscible liquid): II		
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No.		

<chem>CC(=O)c1ccccc1</chem>	Acetophenone	202°C
	Name of structure of compound	Boiling point + melting point
		Physical constants

Conclusion :- The given compound contain ketone functional group.

Tests	Observation	Inferences
acetone + NaOH + C - 3	white ppt colour lower ketone shakes of Sodium nitroso - absence of ketone	presence of ketone ketone

Group I :- Compound containing C, H, [O] elements
Conclusion of functional group of compound :-
Conclusion :- The given compound contain C, H, [O] element.

Tests	Observation	Inferences
HNO ₃ . Acid Range	Hydrogen absent	Hydrogen absent
0.5 cm ³ filtrate + conc.	No precipitate	No precipitate + conc.
0.5 cm ³ filtrate + 5 g sodium	No violet colour	No violet colour
FeSO ₄ soln, 500 g add excess	No green colour	No green colour
0.5 cm ³ filtrate + freshly of H ₂ S O ₄	Nitrogen absent	Nitrogen absent

ii) Test the filtrate for the following reaction.

v) 500 g filtrate the solution. Test for litmus action. It should
be basic
half its volume.

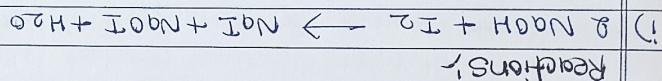
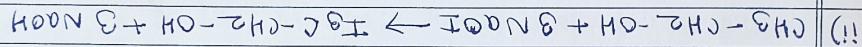
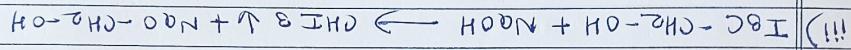
vi) Carry out too more + concentrate the content of dish to
immediately with an asbestos sheet.

Method of Purification: Recrystallization

Purified compound: Water Insoluble Acid
Purification of Compound:-

Alcohol is 11g.

The melting point of derivative Iodotetraen of
Physical constant:-



Reactions:-

VI) Filter dry & determine melting point.
of aneurothiobase from alcohol.

VII) Cool and filter the solid product, wash it with H₂O
iodine solution.

VIII) If yellow colour disappears, then add little more of
now heat the flask on bolling water bath for 10-15 min.

IX) Now add 1 cm³ of iodine solution of 60% Peasights.
Filtering till pale yellow colour of solution disappears.

X) Now add saturated iodine solution with constant
and add to it 3 cm³ of NaOH solution.

XI) Take 1 cm³ of compound in small 100 cm³ conical flask
Proceedure:-

(Iodotetraen derivative of acetylhyde of redones)

Derivative of water miscible Neophyl:

Date / / Page / /

EXPERIMENT:
No.

100°C: melting point of paraffin (n)

8.68; 0.68; 0.68 of patients for whom C1

solvent used for purification: ether (III)

solvent used for purification: ether (III)

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Leacher's Sign:

~~since~~

purified compound	purified compound	physical constant	yield of product	physical constant	solutes insoluble	multiple point	125°C	0.68	acid
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Identified compound (I)	Identified compound (II)	Compound	Compound	Identified compound (III)
Com pounds	Com pounds	Name + formula	Physical and chemical properties	Name + formula
Elements	Elements	Symbol	Consiston of compund	Symbol
Identified reaction	Identified reaction	Group	Consiston of	Group
Com pounds	Com pounds	Physical and chemical properties	Consiston of	Physical and chemical properties

Results

Type :- Liquid - Liquid - Solid mixture

EXPERIMENT: 6
Ternary mixture - Type 26

For water miscible liquid	No strong fluorescence	carboxylic acid absent
water Extract (WE) + water + NaOH	No blue colour	phenol is absent
WE + aq. FeCl ₃	Paper not turn blue	base is absent
WE + red litmus paper	Paper not turn blue	Neutral is present
None of above tests is positive		
For water immiscible liquid		
Liq + NaHCO ₃ , two layers	No effervescence aq + 1:1 HCl → No layer	carboxylic acid absent
Liq + dil. NaOH shake	Aq. + 1:1 HCl → no emulsion	phenol absent
Two layers are formed		
Liq + 1:1 HCl, shake	Aq. + 20% NaOH → gives emulsion	base present
Two layers		

Conclusions

: chemical type of mixture are :-

- i) water immiscible base
- ii) water miscible neutral
- iii) water insoluble phenol

separation of liquid - liquid - solid mixture :-

A. separation method

distillation

In distillation flask

- water insoluble phenol +

water immiscible base

+ NaOH

↓ In Separating funnel

Organic layer

↓

Aqueous layer

↓

water immiscible

↓

base

↓

organic layer

↓

aqueous layer

↓

aqueous layer + HCl

↓

organic layer → water insoluble phenol

B. yield of the separating compound :-

- volume of water immiscible base, 2.8 ml
- volume of water miscible Neutral 3.5 ml
- weight of water insoluble phenol $= 0.6 \text{ g}$

Identification of organic compound : I
(water miscible Neutral)

Preliminary Tests :-

Tests	Observations	Inferences
Nature	Liquid	Alcohols, ketones, aldehyde, etc. may be present
Colours	Colourless	Alcohols, ketones etc
Odours	Fruity	Aromatic hydrocarbons, esters, etc.

Ignition Test :-

Heat compound on an oxidised copper foil

Test for unsaturation

Kromek Test :-

Add dil. KMNO₄ to compound & shake

Detection of Elements (N, S & halogen) :-

Preparation of Lassaigne frits with sodium fusion method

- Heat small amount of Sodium in dry fusion tube till it melts.
- Add small amount of compound to molten sodium.

iii) Heat it again till it becomes red hot & drop it in distilled water taken in porcelain dish immediately covering it with asbestos sheet.

iv) Add two more & concentrate the contents to its half of volume.

v) Cool & filter. Test for litmus action. It should be basic.

vi) Test the filtrate for following reactions.

Tests	Observations	Inferences
0.5 cm ³ filtrate + few drops FeSO_4 boil, cool + dil. H_2SO_4 in excess	No green colour	Nitrogen absent
0.5 cm ³ filtrate + 2-3 drops 5% Sodium nitro-prusside	No violet colour	Sulphur absent
0.5 cm ³ filtrate + conc. HNO_3 . Add AgNO_3	No precipitate	Halogen absent

Conclusion: The given compounds contain C, H, [O] elements.

• Determination of functional group of compounds :-

Group I :- Compounds containing C, H, [O] elements

Tests	Observations	Inferences
Test for ketone compound + NaOH + 2-3 drops of Sodium nitro-prusside Solution	Wine red colour	lowers ketone present

Conclusion: The given compound has ketone functional group.

Physical constant :-

Boiling point	Name & structure of compound
80°C	Ethyl methyl ketone $\text{H}_3\text{C}-\overset{\text{O}}{\underset{\text{C}}{\text{H}}}-\text{CH}_2-\text{CH}_3$

Identification of organic compound : II
(water immiscible Base)

• Preliminary Test :

Tests	Observations	Inferences
Nature	Liquid	Alcohols, ketones, esters, ethers, etc.
Colour	Yellow	May be present Nitro compound etc.
Odour	Fishy	Amines, aniline, etc.
Ignition Test :	Heat the compound on sooty flame	Aromatic compound containing more than four carbon atoms.
on oxidised copper foil		
Test for unsaturation:		
Knoevenagel test :		
Add. dil. Knoevenagel to small amount of compound & shake	Decolourisation	Unsaturated or easily oxidisable compound may be present.

• Detection of elements (N, S and halogen):

preparation of lossgaïne filtrate (sodium fusion extract)

- i) Heat small piece of Sodium metal in dry fusion tube till it melts.
- ii) Add dry substance to the molten Sodium.
- iii) Heat the tube to red heat & drop it in distilled water taken in porcelain dish covering it immediately with an asbestos Sheet.
- iv) Carry two more fusions & concentrate the content of dish to half its volume.

v) cool & filter. Test the filtrate for litmus action. It should be basic

vi) test the filtrate for following reactions:

Tests	Observations	Inferences
0.5 cm ³ filtrate + few g of conc. H_2SO_4 excess	Green colour	Nitrogen present
0.5 cm ³ filtrate + drop of 5% Sodium nitroprusside	No violet colour	Sulphur absent
0.5 cm ³ filtrate + conc. HNO_3 Add $AgNO_3$	No precipitate	Halogen absent

conclusions :- The given compound contain C, H, [O] element.

• determination of functional group of compounds:-

Group II: compounds containing C, H, [O] & N elements!

Tests	Observations	Inferences
Test for Amines:- Dissolve compound in dil. HCl , cool in ice + cold 2% $NaNO_2$ solution of β -naphthol in $NaOH$ gives orange red dye	A clear solution which when added to solution amines (-NH ₂) group present.	Aromatic primary amino (-NH ₂) group

conclusions :- The given compound contain Aromatic primary amino (-NH₂) group.

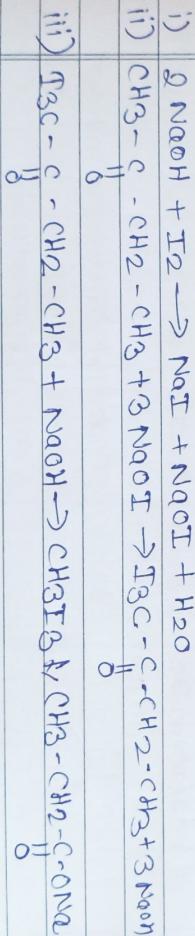
Physical constant :-

Melting point / Boiling point	Name & structure of compound
Boiling point 183°C	Aniline NH_2 

• Derivative of water miscible Neutral :-
(Iodoform derivative of aldehyde & ketones):

- i) Make 1cm^3 compound in conical flask & add 3cm^3 of 2N NaOH solution.
- ii) Add. 8at iodine solution with constant stirring till pale yellow colour of solution persists.
- iii) Heat the flask on boiling water bath for 10-15 min.
- iv) If yellow colour disappears, add little more of iodine.
- v) Cool & filter the solid product wash it with H_2O & recrystallise it from alcohol.
- vi) Filter, dry & determine melting point.

• Reactions :-



Physical constant :-
The melting point of iodoform derivative is 121°C

~~Purification of compound :-~~

- i) purified compound water insoluble phenol
- ii) method of purification :- Recrystallization

1) Reaction conditions:
2) Isolation and purification:
3) Product characterization:
4) Yield: 0.48 g
5) Melting point: 103°C

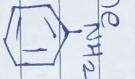
iii) Solvent used for purification: water
iv) Yield of purified product: 0.48 g
v) Melting point of product: 103°C

Results:

• Identified compound : II

Compound	Elements	functional group	physical constant	Name & structure	Derivative property
Identified	Detected	group		of compound melting point	
Waters	Carbon, ketone	Boiling point		Ethyl methyl Iodoform derivative	
miscible Hydrogen H	Hydrogen H group	Point		ketone	active melting point
Neutral oxygen(O)	Oxygen(O)	=80°C		$\text{H}_3\text{C}-\text{C}-\text{O}-\text{I}$	= 121°C

Identified compound : III

Compound	Elements	functional group	physical constant	Name & structure
Identified	Detected	Group	constant of compound	
Waters	Carbon, aromatic	Melting point		Aniline
Immiscible	Hydrogen H, primary	Point		

purified compound:

Purified compound	yield of compound	Physical constant
Waters Insoluble	0.4 g	Melting point = 123°C

EXPERIMENT: 7

No. Date / /
Ternary mixture-~~VI~~^{III} Page 31

Type : Liquid - Liquid - Liquid mixture

Solvability Test :-

Tests	Observation	Inferences
Take mixture in a watch glass and wait for few minutes	Volume of quantity of mixture is decreased	Volatile liquid is present.
Mixture + H ₂ O. Shake well and stand for 10 min	Three layers are observed	Two coates immiscible liquid is present.

Conclusion :- The mixture contains water miscible liquid and 2 waters immiscible liquid

Determination of chemical type :-

(water miscible liquid + water immiscible liquid + water immiscible liquid)

Tests	Observation	Inferences
for water miscible liquid		
i) H ₂ O + sat. NaHCO ₃	No effervescence	Acid absent
ii) H ₂ O + aq. FeCl ₃	No violet colour	Phenol absent
iii) H ₂ O + red litmus	Not turn blue	Base absent
iv) None of the above	-	Neutral present
Test is positive for water immiscible liquid		
i) H ₂ O + sat NaHCO ₃	No effervescence	
ii) H ₂ O + sat Na ₂ CO ₃	No effervescence	

Teacher's Sign: _____

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shake, two layers are formed	No two layers	Acid absent
Liq + dil NaOH excess two layers are formed	Aqueous layers + 1:1 HCl \rightarrow no emulsion	phenol absent
ii) Liq + 1:1 HCl excess shake, two layers are formed	Aqueous layers + 20% NaOH \rightarrow emulsions obtained	Base present
iii) All the above tests are negative		Neutral present

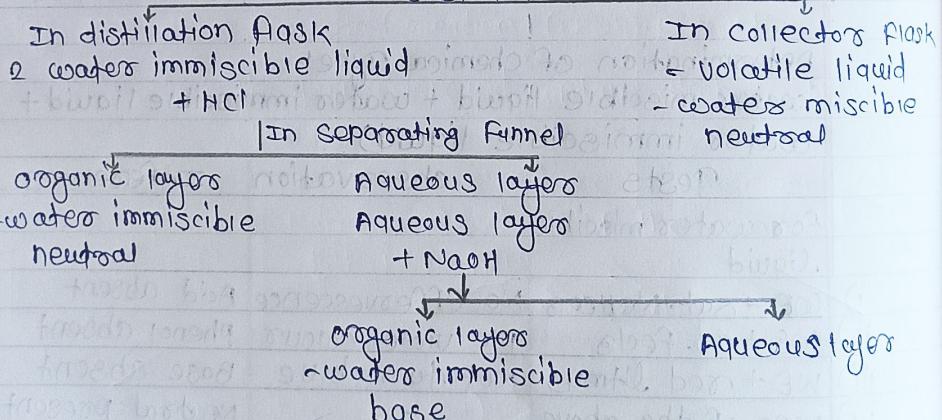
conclusions: the given mixture contain chemical type:

- i) water miscible neutral
- ii) water immiscible base
- iii) water immiscible Neutral

• Separation of Liquid - Liquid - Liquid mixture:

A) separation method

distillation



B. Yield of the separating compound:-

- i) volume of water miscible Neutral = 3 ml
- ii) volume of water immiscible Base = 3.5 ml
- iii) volume of water immiscible Neutral = 2.8 ml

EXPERIMENT:	No.	Date 1/1 Page 32
Identification of organic compound : I (water miscible Neutral)		
Tests	Observations	Inferences
Nature	Liquid	lower aromatic hydrocarbon, alcohol ethers etc.
Colours	Colourless	Amides, esters, alcohol ketones etc.
Odours	Pleasant	Alcohols, etc.
Ignition Test :- Heat compound on an oxidised copper	No sooty	Aliphatic compound etc.
Foil.		
Test for unsaturation KmnO ₄ Test :- Add. dil kmnO ₄ to Compound & shake	No decolorisation	Saturated compound present.
Determination of elements (N, S and halogens) :- preparation of Lassigne filtrate (sodium fusion extract)		
i) Heat small piece of sodium metal in dry fusion tube till it melts.		
ii) Add dry substance to the molten sodium.		
iii) Heat it further to red heat & then drop it in a distilled water taken in a porcelain dish covering it immediately with an asbestos sheet.		
iv) Carry out two more fusion & concentrate the contents to half its volume.		
v) cool & filter. Test for litmus action. It should be basic.		
Sulabh®		Teacher's Sign:

vi) Test the filtrate for the reactions.

Tests	Observations	Inferences
0.5 cm ³ filtrate + prop freshly sat. FeSO_4 , boil, cool & add excess dil H_2SO_4	No green colours	Nitrogen absent
0.5 cm ³ filtrate + 5% sodium nitroprusside	No violet colours	Sulphur absent
0.5 cm ³ filtrate + conc. HNO_3 + AgNO_3 solution	No precipitate	Halogen absent

Conclusion :- The given compound contain $\text{C}, \text{H}, [\text{O}]$ element

Determination of the functional group of compound :-

Group I : Compounds containing $\text{C}, \text{H}, [\text{O}]$ elements.

Tests	Observation	Inferences
Test for alcohols :- Compound (if liq) + Sodium dry + test tube	Effervescence due to formation of CH_2O present.	Alcoholic -OH group

Conclusion :- The given compound contain alcoholic functional group.

Physical constant :-

Melting point	Name & structure of the compound
Boiling point 78°C	Ethyl alcohol $\text{CH}_3 - \text{CH}_2 - \text{OH}$

Identification of organic compound :-
(soluble in water, immiscible in neutral)

Tests	Observations	Inferences
Nature	Liquid	Alcohols, ketenes esters, ethers, etc may be present.

Colours	white	Amides, anilides, ketones, esters, alcohols etc.
odours	sweet, strong	ketones, anilides etc.
Ignition Test : Heat comp. on an oxidised foil of copper.	sooty flame	Ac. Comp or alpha- tic comp. containing more than 4-C
Test for unsaturation		
KMNO ₄ Test : Add. dil KMNO ₄ to small amount of compound & Shake	Decolourisation unsaturated or easily oxidisable Compound may be present.	

- Detection of elements (N, S and halogen) :
Preparation of Lassaigne filtrate (sodium fusion extract):
 - Heat freshly sodium metal in dry fusion tube till it melts.
 - Add small amount of dry substance to molten sodium
 - Heat it to fusions to red heat & drop it in distilled water taken in porcelain dish covering immediately with an asbestos sheet.
 - Carry to more fusions & concentrate the contents of dish to half its volume.
 - Cool & filter. Test for litmus action. It should be basic

Tests	Observations	Inference
0.5 cm ³ filtrate + fresh sat. FeSO ₄	No green colour	Nitrogen absent

Teacher's Sign: _____

boil, cool add excess dil. H_2SO_4		
0.5 cm ³ filtrate + 5% Sodium nitro-prusside solution	No violet colour	Sulphur absent
0.5 cm ³ filtrate + conc. HNO_3 + AgNO_3 solution.	No precipitate	Halogen absent

Conclusions :- The given compound contains C, H, [Co] elements.

• Determination of the functional group of compounds :-

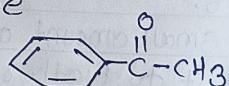
Group I :- Compounds containing C, H, [Co] elements.

Tests	Observations	Inferences
Test for ketone Compound + NaOH + Sodium nitroprusside solution	Orange red colour	Lower ketone Present

Conclusion :- The given compound contain Ketone functional group

• Physical constant

Boiling point	Name & Structure of the Compound
202 °C	Acetophenone



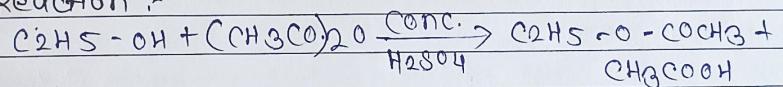
Derivative of waters miscible Neutral :-
(Acetyl derivative of alcohols)

• Preparation :-

i) Take 0.5 cm³/g of the compound taken in dry hand glass test tube, add 2 cm³ of acetic anhydride and 2-3 drops of conc. Sulphuric acid.

- ii) warm the test tube on water bath for 10-15 min.
- iii) cool & pour in 20 cm³ cold-water. product will separate out.
- iv) filter the product. Recrystallise it from alcohol.
- v) filter, dry & determine the melting point.

- Reaction :-



- physical constant :-

The melting point of acetyl derivative of alcohol is 114°C

- purification of compound :-

i) purified compound :- water immiscible base

ii) method of purification : Distillation

iii) volume of purified product :- 2.6 ml

iv) Boiling point of purified product :- 184°C

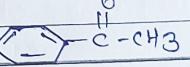
Teacher's Sign:

• Results :-

Identified compound : I

Compound	Elements	Functional Group	Physical constant	Name & structure of compound	Desservative property
Waters	Carbon (C), Hydrogen (H)	Alcoholic	Melting point	Ethyl alcohol	Acetyl derivative of alcohol
Immiscible		$\sim\text{OH}$			
Neutral	Oxygen (O)	group	$=78^\circ\text{C}$	CH_3COH	Melting point $=114^\circ\text{C}$

Identified compound : II

Compound	Elements	Functional Group	Physical constant	Name & structure
Waters	Carbon (C), Hydrogen (H)	Lowers ketone	Boiling point	Acetophenone
Immiscible				
Neutral	Oxygen (O)	group	$=202^\circ\text{C}$	

• purified compound :-

Purified compound	Yield of product	Physical constant
Waters Immiscible Base	2.6 ml	Boiling point $=184^\circ\text{C}$

25/1/2024

Teacher's Sign:

EXPERIMENT: No. 8

Date 1/1/36

Ternary mixture

Type :- Liquid - Liquid - Liquid mixture

So

Solubility Test :-

Tests	Observations	Inferences
Take a mixture in watch glass and wait for few minutes	Quantity of mixture is not decrease	so volatile liquid is absent.
mixure + H ₂ O. shake well and stand for 10 minutes	Three layers are formed	3 water immiscible liquid is present.

Conclusion :- The compounds in the given mixture are three water immiscible liquid.

Determination of chemical Type :-

(water immiscible liquid + water immiscible liquid + water immiscible liquid)

Tests	Observations	Inferences
for water immiscible liquid		
i) Liq + sat. NaHCO ₃ shake. two layers are formed.	Aq. layers + 1:1 HCl → no two layers	Carboxylic acid is absent.
ii) Liq + dil. NaOH excess shake. two layers are formed.	Aq. layers + 1:1 HCl → emulsion formed	phenol is present.
iii) Liq + 1:1 HCl excess shake two layers formed.	Aq. layers + NaOH → emulsion formed	base is present
iv) All the above tests are negative		Neutral is present Teacher's Sign:

Swasth®

Conclusion : The chemical type of given mixture :-

i) water immiscible phenol

ii) water immiscible base

iii) water immiscible Neutral

separation of Liquid - Liquid - Liquid mixture :-

A. Separation method -

In Separating funnel

Mixture + NaOH

organic layers

Aqueous layers

- organic layers + HCl

- Aq. layers + HCl

organic layers

Aqueous layers

organic layers

Aqueous layers

- water immiscible - Aq. layers + water immiscible layers

Neutral

given NaOH

Phenol

organic layers

Aqueous layers

organic layers

Aqueous layers

- water immiscible

Base

B. Yield of the Separating compound :-

i) Volume of water immiscible phenol = 3.7 ml

ii) Volume of water immiscible base = 3.5 ml

iii) Volume of water immiscible Neutral = 4 ml

Identification of organic compound :-

(water immiscible Base)

• Preliminary Tests :-

Tests	Observations	Inferences
Nature	liquid	Alcohols, ketones, esters, ethers etc. may be present.
Colours	Yellow	Nitro compounds, quinones etc.

odours	fishy	Anilines, amines etc. ar. comp. or aliphatic compounds containing more than 4-6 atoms.
ignition Test: Heat compound on an oxidised copper foil.	fishy Sooty	
Test for unsaturation		
KMNO ₄ Test:- Add few drops of very dil. KMNO ₄ to compound and shake.	Decolourisation	unsaturated or easily oxidisable compound may be present.

Detection of Elements (N, S, halogen):-

Preparation of Lassaigne filtrate (sodium, fusion extract)

- i) Heat piece of sodium metal in dry fusion tube till it melts.
- ii) Add small amount of dry substance to molten sodium.
- iii) Heat it to red hot and drop it in distilled waters taken in a porcelain dish covering immediately with asbestos sheet.
- iv) Carry out two more fusion & concentrate the content in half its volume.
- v) Cool, & filter. Test for litmus action. It should be basic.
- vi) Test the filtrate for the reactions.

Tests	Observations	Inferences
0.5 cm ³ filtrate + fresh FeSO ₄ boil, cool + dil. H ₂ SO ₄ excess	Green Colour	Nitrogen present
0.5 cm ³ filtrate + 5% Sodium nitroprusside	No violet colour	Sulphur absent

Teacher's Sign: _____

0.5 cm ³ filtrate + conc. HNO ₃ + AgNO ₃ Solution	No precipitate	Halogen absent
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Conclusion : The given compound contain C, H, O, N elements.

- Determination of the functional group of compound :
Group II : compounds containing C, H, O, N elements.

Tests	Observations	Inferences
Test For Amines : Dissolve compound in dil. HCl cool in ice + cold 2% NaO ₂ soln	pale yellow solid oil turning greenish on addn of NaOH	Tertiary amino group present (N ⁺)

Conclusion : The given compound contain tertiary amino functional group.

Physical constant : 198°C

Boiling point	Name & structure of the compound
198°C	Dimethyl aniline 

Identification of organic compound : II
(Water Immiscible Neutral)

Preliminary tests -

Tests	Observation	Inferences
Nature	Liquid	Lowers aromatic hydrocarbon alcohol, ketones etc. may be present
Colour	Whitish yellow	Aromatic hydrocarbons, amides etc.
Odour	Bitter almonds	Nitro compounds, aromatic aldehyde etc.

Ignition test :-

Heat compound on
oxidised copper foil.

Sooty flame

Arr. Comp. on alpha-
dic compounds
Containing more
than 4-C atoms

Test for unsaturation:

KmnO₄ Test :-Add. dil. kmnO₄ to
Compound & shake

De colourisation

unsaturated or
easily oxidisable
compound may
be present.

- Detection of elements (N, S & halogens):
preparation of Lassaigne filtrate (sodium fusion extract)
 - Heat the sodium metal in dry fusion tube till it melts
 - Add small amount of dry substance to molten sodium.
 - Heat it to red heat & drop it in distilled waters taken in porcelain dish covering it immediately with an asbestos sheet.
 - Carry out two more fusions & concentrate the contents of dish to half its volume.
 - Cool & filter. Test the litmus action. It should be basic.
 - Test the filtrate for the following reactions.

Tests	Observations	Inferences
0.5 cm ³ filtrate + fresh Resoy boil, cool & add excess dil.	Green colour	Nitrogen absent
H ₂ SO ₄ 0.5 cm ³ filtrate + 5% sodium nitroprusside	No violet colour	Sulphur absent

0.5 cm ³ filtrate + conc. HNO ₃ + AgNO ₃	No precipitate	Halogen absent
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Conclusion :- The given compound contain C, H, O, N elements.

- ~~Determination of functional group of compounds :-~~
- ~~Group 1 :- Compounds containing C, H, O, N elements.~~

Tests	Observations	Inferences
Test for hydrocarbon Dissolve 2-3 drop of compound in benzene + 2 cm ³ dil. H ₂ SO ₄ in benzene Shake well	Remains violet in colour	Hydrocarbon present

Conclusion :- The given compound contain hydrocarbon functional group.

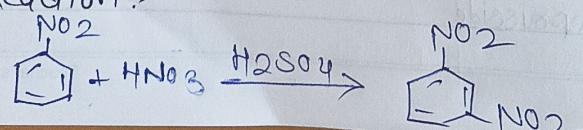
Physical constant :-

Boiling point	Name & structure of compound
210°C	Nitrobenzene 

- Derivative of water immiscible Neutral :- Preparation :-

- i) Take compound in dry test tube.
- ii) Add conc. HCl to it. Add pinch of Zn dust then boil & cool it.
- iii) Add water and then NaOH solution drops of this solution to NaCl solution.
- iv) violet colour is produced
- v) on warming with fuming HNO₃ & H₂SO₄ gives m-dinitro benzene.

• Reaction :-



physical constant :-

The melting point of derivative of water immiscible Neutral is 90°C .

Purification of compound :-

i) purified compound : water Immiscible phenol.

ii) method of purification : distillation

iii) yield of purified product : 3 ml

iv) Boiling point of product : 182°C

Results :-

- Identified Compound :- +

Compound Identification	Elements Detected	Functional Group	Physical Constant of compound	Name & structure
water	Carbon, C	Tertiary	Boiling point =	dimethyl aniline
immiscible	Hydrogen, H	amino		$(\text{CH}_3)_2\text{N}-\text{C}_6\text{H}_5$
base	oxygen, (O)	group	193°C	

- Identified compound: II

Compound Identified	Element Detected	Functional group	Physical constant	Name & Structure of compound	Derivative Formation with melting point
water	Carbon, H	Hydro-	Boiling point	Nitroben- zene	Nitro derivative melting point
Immiscible Neutral	Hydrogen oxygen(6)	Carbon		NO_2	
		Nitrogen N			-90°C

- purified compound

purified Compound	yield of compound	Physical constant
water immiscible	3 ml	Boiling point
phenol		= 182 °C

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